Factors Influencing Retailing Performance of Farm Inputs in South 24 Parganas District of West Bengal

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ABSTRACT

A survey of 118 farm input retailers selected from six blocks of South 24 Parganas district of West Bengal was conducted in 2007-08 to study the contribution of the socio-economic and personal traits towards the retailing performance of the input retailer. The outcome of the result revealed that 'utilization of information source', 'agricultural training received', 'knowledge about general agriculture except plant protection', 'knowledge about plant protection', 'retailing ability/skill', 'communication skill', 'services provided for agricultural development', 'sale promotional activity', 'number of farmers dealt with' and 'investment in purchasing agricultural inputs' had positive and significant relation with the retailing performance of the input retailer. The selected socio-economic and personal traits showed multicollinearity among themselves for which principal component analysis was computed. Five principal components were extracted from thirteen independent variables. The coefficient of multiple determinations (R^2) indicated that these components could predict 67.8 per cent of the total variance. The F values were found to be significant indicating the effectiveness of these variables in contributing retailing performance of the farm input retailer, when they function jointly.

Key words: *Factors of retailing performance; Farm input retailer; Principal component analysis;*

*I*n developing countries the hastened growth in agricultural production depends on exploitation of the existing production potential as well as continuous raising of the potential through technological changes, which requires sustained and rapid growth in the use of agricultural inputs such as seeds, fertilizers, pesticide, farm implements, farm machinery etc (*Desai, 1985*). The farmers buy such inputs in their locality more often from private traders like input retailers than government agencies (*Mitra, 1999*). Inspite of their business interest, the input retailers provide various services to the farmers for better production of the crops (*Shamanta, 2004; Jana, 2005; Stone, 2006; Whipker and Akridae, 2006; Matemba, 2007; Chandrashekara and Kanaka Durga, 2007*). Their services to the farmers are in turn related to their retailing performance. So, it is necessary to identify the factors associated with the retailing performance of the input retailers for suitable intervention so that they can render better services to agricultural development. Although the role of input retailers are well studied, the correlations of retailing performance has been less addressed empirically (*Jana, 2005*). The contribution of these factors in retailing performance has hardly been studied especially at the academic level. Hence, the present study was undertaken to study the socio-economic and personal traits of the input retailers and to find out the relationship between these traits with their retailing performance and there by assessing the contribution of such traits to their retailing performance.

METHODOLOGY

The present study was conducted in South 24 Parganas district of West Bengal, selected purposively from eighteen districts of the State during 2007- 08 as the district was familiar to the researcher and requisite data were available with the Department of Agriculture. The farm input retailers dealing with pesticides were also selling fertilizers, seeds and farm implements too. For this reason the sample was drawn from pesticide retailers specifically so as to get information regarding different types of inputs in best possible way. Probability

proportional to size sampling technique were followed and 118 retailers from 233 input retailers were selected from six blocks of the district (50 per cent of the population dealing with pesticide). Thirteen independent variables and one dependent variable were selected in relation to the objectives of the study. The thirteen independent variables were 'Experience', 'socio-economic status', 'utilization of information source', 'agricultural training received', 'knowledge about general agriculture except plant protection', 'knowledge about plant protection', 'retailing ability/skill', 'communication skill', 'services provided for agricultural development', 'sale promotional activity', 'number of farmers dealt with', 'investment in infrastructure' and 'investment in purchasing agricultural inputs'. Total sale value (in Indian Rupees) from various agricultural inputs was taken as dependent variable. The average of the last three successive years' sale value from input items expressed (in Indian Rupees) was taken for measuring the dependent variable. All the variables were selected considering experts' agreement in relation to the objectives of the study. The data were collected through personal interview method using pre-tested semi-structured interview schedule. Mean, standard deviation, coefficient of correlation, principal component analysis and multiple linear regression were employed for data analysis through SPSS.

RESULTS AND DISCUSSION

The computed coefficient of correlation (r) indicates that except 'socio economic status', 'experience in retailing' and 'investment in infrastructure', all other selected independent variables were related positively and significantly with the total sale value of the retailers. It is revealed from Table 1 that 'utilization of information sources' (r=0.521), 'agricultural training' (r=0.358), 'knowledge about general agriculture except plant protection' (r=0.344), 'knowledge about plant protection' (r=0.474), 'retailing skill/ability' (r=0.289), 'communication skill' (r=0.498), 'services provided for agricultural development' (r=0.275), 'sales promotional activity' (r=0.547), 'number of farmers dealing with' (r=0.528) and 'investment in purchasing agricultural inputs' (r=0.929) had positive and significant relation at 0.01 level of probability. This implies that farm input retailers who had better contact with agricultural department and other information sources, access to need-based agricultural training, knowledge about general agriculture except plant protection, knowledge about plant protection, retailing skill/ability, communication skill, better services for agricultural development, good sales promotional activity, more number of farmers as client and more investment in purchasing agricultural inputs had higher retailing performance in retailing various agricultural

Table 1: Correlation between selected independent variables and total sale
of the farm input retailer (N=118)

Variables	Unit	Min	Max	Mean	Standard Deviation	Correlation coefficient ('r' values)
Socio economic status	Score	6.00	15.00	10.04	1.88	0.97
Experience in retailing	Year	2.00	30.00	12.53	5.59	0.073
Utilization of information sources	Score	3.00	17.00	9.76	3.15	0.521 **
Agricultural training received	Days	0.00	8.00	2.19	2.03	0.538 **
Knowledge about general agriculture except plant protection	Score	4.00	40.00	19.51	7.86	0.344 **
Knowledge about plant protection	Score	8.00	48.00	30.03	9.93	0.474 **
Retailing skill	Score	23.00	67.00	52.43	7.56	0.289 **
Communication skill	Score	12.00	32.00	23.17	3.88	0.498 **
Services provided for agril. development	Score	40.00	109.00	84.19	13.26	0.275 **
Sales promotional activity	Score	10.00	30.00	20.97	4.50	0.547 **
Number of farmers dealt with	Number	150.00	2200.00	866.82	532.72	0.528 **
Investment in infrastructure	Rupees	1000.00	10000.00	3228.81	1714.25	0.087
Investment in purchasing agril. inputs	Rupees	25000.00	300000.00	128661.02	69429.32	0.929 **

inputs. This finding is more or less in conformity with the findings of *Jana (2005)* who also found correlation among a string of independent variables with the retailing performance of the input retailers. However, as inter-correlation found among the independent variables (not shown in the table), principal component analysis was done to reduce the multi-collinearity. The extracted principal components were then regressed stepwise with the dependent variable to explain the variance in the dependent variable.

Extracted principal components and their naming: Varimax rotation method as suggested by *Kaiser (1958)* was used for ensuring the maximization of variance of a variable under a particular factor. Table 2 shows the

rotated factor (Varimax) matrix of independent variables with differential factor loadings. The communality column shows the total amount of variance of each variable retained in the factors. For the interpretation of the PCs, variables with high factor loadings and high communality were considered from the rotated factor matrix.

P C 1: Agricultural technology related knowledge and exposure : Principal component 1 accounted for 18.448 per cent of the total variance. Variables, 'knowledge about general agriculture except plant protection', 'knowledge about plant protection' and 'agricultural training received' had high and positive loading on the principal component (0.827, 0.783 and

Table 2: Rotated principal component matrix (varimax) of thirteen independent variables

Independent variable	PC 1	PC 2	PC 3	PC 4	PC 5	Communality
X 1. Socio-economic status	-0.007	-0.033	0.103	0.905	-0.045	0.832
X 2. Experience in retailing	-0.347	0.004	0.431	-0.374	-0.290	0.530
X 3. Utilization of information sources	0.502	0.563	0.060	-0.098	-0.192	0.619
X 4. Agricultural training received	0.585	-0.001	0.241	0.169	-0.403	0.591
X 5. Knowledge about general agriculture except PP	0.827	0.135	0.027	0.090	0.245	0.770
X 6. Knowledge about plant protection	0.783	0.196	0.262	-0.060	0.104	0.735
X 7. Retailing skill	0.135	0.193	0.551	0.318	-0.063	0.465
X 8. Communication skill	0.396	0.193	0.675	-0.112	0.131	0.679
X 9. Services provided for agricultural development	0.105	0.149	0.779	0.051	0.091	0.651
X 10. Sales promotional activity	0.056	0.740	0.389	0.161	0.068	0.733
X 11. Number of farmers dealt with	0.006	0.845	0.047	-0.082	0.082	0.730
X 12. Investment in infrastructure	0.115	0.038	0.125	-0.011	0.843	0.742
X 13. Investment in purchasing agricultural inputs	0.429	0.672	0.207	0.018	-0.010	0.678

0.585 respectively; Table 3. In the rural areas farm input retailers were the key persons who catered the agricultural inputs such as seeds, fertilizers, pesticides etc. to the farmers. On the other hand, the farmers had easy access to the input retailers from whom he could get necessary information about the inputs. The retailer played an important role in disseminating technological package in the rural areas. Although, the motive associated with this activity is profit maximization, but he is the man most often consulted for advice on crop protection as well as on general agricultural aspects. If regular training is provided to the retailers this will help to update their knowledge, which will ultimately help the farmers of the locality. This implies that the retailers having need-based agricultural training, higher knowledge on general agriculture and plant protection may have higher level of sale volume/value from retailing various agricultural inputs. PC1 was thus named as

'agricultural technology related knowledge and exposure'.

PC 2: Investing in retailing : Principal component 2 accounted for 16.814 per cent of the total data variance. Variables, 'sales promotional activity', 'investment in purchasing agricultural inputs', 'number of farmers dealt with' and 'utilization of information sources' had high and positive loading on the component (0.740, 0.672, 0.845 and 0.563 respectively; Table 3. More investment helped the retailer in purchasing varieties of farm inputs by which more farmers could be supported, which ultimately helped the retailers to increase the sale value. Apart from financial investment, investing in collection of information from departmental agricultural personnel as well as various sources such as posters, leaflets, booklets etc. also helped him /her in promoting business. Sales promotion techniques and maintaining wide number of customers were also contributing factors in

Table 3. Variables considered for the PCs with corresponding rotated component loadings

Principal component (PC)	Independent variable	Rotated component loadings	Per cent total variation
PC 1: Agricultural technology related knowledge and exposure	Knowledge about general agril. except PP	0.827	
	Knowledge about plant protection	0.783	
	Agricultural training received	0.585	18.448
PC 2: Investing in retailing	Investment in purchasing agril. inputs	0.672	
	Utilization of Information sources	0.563	
	Sales promotional activity	0.740	16.814
	Number of farmers dealt with	0.845	
PC 3: Marketing related skills and knowledge	Experience in retailing	0.431	
	Retailing skill	0.551	14.657
	Communication skill	0.675	
	Services provided for agril. development	0.779	
PC 4: Socio-economic status	Socio-economic status	0.905	8.901
PC 5: Infrastructure	Investment in infrastructure	0.843	8.523
Total variation:		-	67.343

overall sale value. So, PC 2 was termed as 'investing in retailing'.

PC 3: Marketing related skills and knowledge: This factor accounted for 14.657 per cent of the total variance. Four variables, 'experience in retailing', 'retailing skill', 'communication skill' and 'services provided for agricultural development' had loadings 0.431, 0.551, 0.675 and 0.779 respectively on the component (Table 3). Retailing is the way of distribution of farm inputs throughout the country. Retailer / dealer was the terminal person in the marketing channel. So, he had a regular and frequent contact with his clients, the farmers. Apart from selling the farm inputs, he generally offered advisory services in agriculture and allied fields and also provided credit to the farmers for purchasing inputs. The farmers put importance on his dealings, extent of credibility and attitude of cooperation to make a decision on purchasing a product from the retailer. Retailing skill and communication skills were two key elements in business promotion. Experience in retailing also helped in building marketing knowledge and skills; and providing services to farmers was an effective strategy for sale promotion. The relationship management and skill of the retailer with the farmers has close association ship with the total sale from retail business. On this basis PC 3 was named as 'marketing related skills and knowledge'.

PC 4: Socio-economic status : Principal component 4 accounted for 8.901 per cent of total data variance. Variable, 'Socio-economic status' of the retailer had (0.905) high loading over the component (Table 3). Socio-economic status creates an impact over the client farmers and it has impact over sale value too.

PC 5: Investment in infrastructure: Principal component 5 accounted for 8.523 per cent of the total data variance. Variable, 'investment in infrastructure' had (0.843) high loading on the component (Table 3). Infrastructure attracts customers and to a great extent it creates favourable environment to retailing business.

The multiple regression analysis was done to assess the contribution of principal components to the dependent variable. The stepwise regression analysis was used to determine the contribution of the significant components while eliminating other non-significant components. 'Investment in retailing' was the single best predictor followed by 'agricultural technology related knowledge and exposure', and 'marketing related skills and knowledge' In Model 3 maximum three principal components were included as independent variables which could explain the highest variance in the dependent variable. Beyond this step, no further variable could be included in the model as predictor components having non-significant F values were eliminated from the model. It is also revealed from the Table 4 that the regression coefficients of investment in retailing ($\beta = 0.675$), agricultural technology related knowledge and exposure ($\beta = 0.385$) and marketing related skills and knowledge ($\beta = 0.273$) were highly significant at 0.01 level. These variables could be termed as good predictors in influencing the total sale value of the input retailers.

Table 4. Multiple regression coefficients of principal components on dependent variable (Stepwise)

Model	Independent variables	β	t	Sig. t	F	r^2
1	PC 2 (Investment in retailing)	0.675	9.853**	0.000	97.079**	0.456
2	PC 2 (Investment in retailing)	0.675	11.497**	0.000	87.551**	0.604
	PC 1 (Agricultural technology related knowledge and exposure)	0.385	6.552**	0.000	-	-
3	PC 2 (Investment in retailing)	0.675	12.702**	0.000	80.050**	0.678
	PC 1 (Agricultural technology related knowledge and exposure)	0.385	7.239 **	0.001	-	-
	PC 3 (Marketing related skills and knowledge)	0.273	5.137**	0.000	-	-
	Constant	-1.708E-18	-	-	-	-

** Significant at 0.01 level

The R^2 value of Model 3 ($R^2 = 0.678$) suggested that three principal components jointly contributed 67.8 per cent towards total sale value. This means that all these independent variables explained the variation in the total sale value of the farm input retailer, taken as a dependent variable up to 67.8 per cent. The F value (F = 80.050) was also found to be significant at 0.01 level of probability, indicating the effectiveness of the Model

The following regression equation for the prediction of the total sale value of the farm input retailer was obtained on the basis of stepwise multiple regression ($R^2 = 0.678$):

$Y = -1.708E - 18 + 0.385 \times PC\ 1 + 0.675 \times PC\ 2 + 0.273 \times PC\ 3$ (See Table 4)

CONCLUSION

The factors which emerged as being important in influencing the performance of the retailers may be addressed effectively for improving the retailers' performance level so that agricultural development can be accelerated through the better services rendered by the input retailers. The study will be helpful to the policy makers and extension personnel as well to improve the efficiency of the input retailers.

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